III. REMARKS

The abstract has been amended to deleted all reference numbers and "Fig. 4". It is therefore submitted that it is no longer objectionable

Claims 10-11 and 15-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Wong.

It is respectfully submitted that Wong does not disclose anything other than what is well known to anyone who has worked through the channel coding of traffic channels of AMR-coded (Adaptive Multirate) GSM. It is very well known that different bit positions in a transmission frame have different vulnerability to errors (page 4, lines 14-15, in Wong), and as an obvious countermeasure it has been known for a long time to re-arrange the bits so that the most important bits go to those bit positions which are the least vulnerable (page 4, lines 20-22, in Wong). However, the known re-arranging principles, and also those disclosed in Wong, have been based on incomplete understanding of how the combination of convolutional coding and puncturing really affects the vulnerability to errors of the bit positions.

The former assumption, which only the present inventors have shown be wrong, was that if applying the unpunctured convolutional code, the so-called "mother" code, resulted in some distribution of error probability over the frame, a punctured version of the same convolutional code would directly "inherit" the same property, only scaled with the amount of puncturing. In other words, Wong and similar prior art assume that if one knows the distribution of error probability after applying an unpunctured convolutional mother code, and then applies an

increasing amount of puncturing, the resulting error probability would be proportional to the amount of puncturing. Traditionally the amount of puncturing would monotonically increase towards the end of a frame because the least important bits were made to appear at the end of the frame so that increasing error probability there would not deteriorate too much the chances of successful communication.

The present inventors had the insight that the particular choice of a puncturing scheme may actually have quite unexpected effects on the distribution of error probability. Thus, whereas the prior art like Wong suggest deciding the bit re-arranging scheme based on the known properties of the convolutional code and assuming that punctured versions of said code will inherit the same properties, the present invention suggests carefully analyzing the properties of the designed convolutional code **after** the puncturing scheme has been fixed, which results in much more accurate knowledge about the bitwise error protection capability available for each channel encoded bit.

Conceptually the invention represents an **additional** rearranging of the bits, so that the bit order as rearranged according to the invention can be obtained for example by utilizing a prior art bit reallocation unit to perform the known bit rearranging and adding a second, additional bit reallocation unit to further (re-)reallocate the bit positions. However, the same final allocation order of bit positions can equally well result from initially programming the one and only bit reallocation unit to perform a combination of the old, known, rearranging and the new rearranging of the present invention.

In the present formulation of independent method claim 10 the following passage is found:

> "rearranging the sequence of bits ... before convolutionally encoding and puncturing it, into an order that **has been found to produce**, during the course of convolutionally encoding with a certain convolutional code **and puncturing with a certain puncturing pattern**, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors exhibits a predefined behaviour" (emphasis added)

Similar language is in the remaining independent claims. In particular, claim 15 is directed to the operation of a transmitter only. It contains the same passage as above, if only in a slightly different order of words. Thus it is allowable.

Claim 17 concerns the method of producing the rearranging tables. This claim also refers to simulating the operation of convolutional coding and puncturing, and using the observed true distribution of error probability as the basis for producing the rearranging table. Again, if one uses as a starting point the argument that Wong only investigated error probability after convolutional coding and simply assumed that an increasing proportional amount of puncturing would increase error probability respectively, claim 17 is allowable.

Claim 18 is the independent claim for a transmitter, and corresponds very closely to claim 15 so it is allowable.

Wong discloses rearranging the sequence of bits, before convolutionally encoding and puncturing it, into an order that **is assumed to produce** a predefined statistical probability of transmission errors. To be even more exact, Wong's method **has been found to produce**, during the course of convolutionally encoding, a convolutionally encoded sequence where the statistical probability of transmission errors exhibits a predefined behaviour - and from this established knowledge Wong has extrapolated that said predefined behaviour would only change in a predefined way (and thus result in some other but still predefined behaviour) also after **puncturing with a certain puncturing pattern**.

Since the last-mentioned extrapolation in Wong's thinking is actually incorrect, the present invention is still the first to have demonstrated a convolutionally encoded **and punctured** sequence where the statistical probability of transmission errors **really** exhibits a **truly** predefined behaviour. The quoted features of the independent claims are thus novel over Wong.

Thus the rejection of claims 10-11 and 15-19 under 35 USC 102 should be withdrawn. Further, since these features are not suggested by Wong, these claims are unobvious over it.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong and further in view of Applicant's admitted prior art.

Since the admitted prior art also fails to disclose or suggest the above features, combining it with Wong does not result in the present invention. Thus, the rejection of claims 12-14 should be withdrawn.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,

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